Remarks/Arguments

Claims 1-21 are pending. Claims 1-6 and 9-14 stand rejected on varying grounds under § 102(b) or 103(a), while claims 7-8 and 15-16 are objected to as dependent on a rejected base claim and claims 17-21 are allowed.

Independent claims 1 and 9 have been amended to clarify the language of these claims.

In view of the comments below, Applicant respectfully requests that the Examiner enter these amendments and reconsider the present application including claims 1-21 and withdraw the rejection of or objection to the respective claims.

a)   Claims 1-4 and 9-12 stand rejected under 35 U.S.C. 102(b) as being anticipated by Morikawa (U.S. Patent No. 5,898,829).

The present invention concerns inventive methods and apparatus for dynamically reallocating processing resources from one (e.g., less critical under present circumstances) function to another (e.g., more critical under present circumstances) function when, e.g., a fault occurs or is detected that relates to the processing resources that are supporting the more critical function. This approach to providing redundancy in processing resources can result in economic advantages (compared to normal 2n or n + m redundant systems) since there are no costs incurred for processing resources whose only role is providing a backup or redundant resource for other processing resources.

Morikawa discusses redundant processors and switching the state of a backup processor

to active responsive to a fault in an active processor. In stark contrast to the claimed invention,

Morikawa discusses a fault-tolerant computer system that in FIG. 2 and in relevant part (col. 6,

line 59 et. sequence) shows a conventional 2n redundant processing system wherein a first

processor 10 provides a signal S10 (often referred to as a heartbeat) to a second processor 20 and

the second processor provides a corresponding signal S20 to the first processor 10. One of the

processors assumes an active state while the other assumes a backup state, where these states are

switched, i.e. the processor in the backup state assumes the active state whenever a fault is

detected in the processor in the active state. Note that the processors 10 and 20 are identical and

support identical functionality, namely control of the controlled system via bus 50.

Unfortunately processing resource costs with the Morikawa approach are at least double the

normal processing costs since at least one complete processor is setting idle, i.e. waiting for a

fault, most of the time.

Applicant's claim 9 defines a multi-processor apparatus that is arranged and constructed

to dynamically reallocate processors to provide redundant functionality with claim 1 defining an

analogous method. Claim 9 recites:

> "A multi-processor based apparatus arranged and constructed to dynamically reallocate
> processors to provide redundant functionality, the apparatus comprising in combination:
>> a first processor supporting a first function, the first function having a first priority;
>> means for detecting a fault in said first function;
>> a second processor supporting a second function different from the first function, the
> second function having a second priority; and

> means for reallocating, responsive to said fault, said second processor to support said first function when a predetermined relationship corresponding to said first priority and said second priority exists."

Applicant respectfully submits that Morikawa does not show or suggest the claimed "second processor supporting a second function different from the first function, the second function having a second priority;" since the processors 10, 20 or Morikawa support identical functionality, i.e. control of the controlled system as noted above. The Examiner seems to suggest that a processor assuming either an active or backup state is supporting different functions, however Applicant respectfully disagrees with this construction noting that a processor may assume many unique states all pursuant to supporting a given function. Furthermore since there is no second function corresponding to the second processor in Morikawa there is no means for reallocating the second processor to support the first function as claimed.

For at least these reasons, Applicant respectfully submits that Morikawa does not show or suggest all limitations of claim 9 or by analogous reasoning claim 1 and thus does not properly support a §102(b) rejection of these claims or by virtue of dependency claims 2-4 and 10-12 respectively dependent thereon. Thus Applicant respectfully requests the Examiner to reconsider and withdraw the rejection of claims 1-4 and 9-12 under 35 U.S.C. 102(b) based on Morikawa (U.S. Patent No. 5,898,829).

b)   Claims 5-6 and 13-14 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Morikawa (U.S. Patent No. 5,898,829) in view of Goodwin, et al. (U.S. Patent No. 4,654,846). Goodwin, et al. is another reference that uses 2n redundancy, i.e. each system or subsystem has a primary and backup version where the backup version may become the primary version in the event of a suspected fault (see FIG. 1 for example). Claims 5 and 6 are dependent on claim 1 and

at least by virtue of dependency on a claim that is believed to allowable over these references

claims 5 and 6 should also be allowable. Claims 13 and 14 are dependent on claim 9 and at least

by virtue of dependency on a claim that is believed to allowable over these references claims 13

and 14 should also be allowable. Thus and at least for these reasons, Applicant respectfully

requests that the Examiner reconsider and withdraw the rejection of claims 5-6 and 13-14 under

35 U.S.C. 103(a) based on Morikawa (U.S. Patent No. 5,898,829) in view of Goodwin, et al.

(U.S. Patent No. 4,654,846).

c)   Claims 7-8 and 15-16 are objected to as being dependent upon a rejected base claim.

Applicant notes and agrees that these claims recite allowable subject matter. In view of the

comments above and clarification revisions to claims 1 and 9 it is believed that claims 1 and 9

are in condition for allowance. By virtue of dependency on claims 1 and 9, respectively, it is

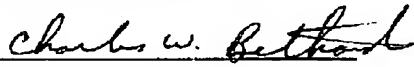believed that claims 7-8 and 15-16 are allowable in their present form.

d)   Claims 17-21 are allowed. Applicant agrees that these claims are allowable over the

references of record.

Appl. No. 10/083,419
Amendment dated March 3, 2005
Reply to Office Action of December.3, 2004

Accordingly, Applicant respectfully submits that the claims, as amended, clearly and patentably distinguish over the cited reference of record and as such are to be deemed allowable. Such allowance is hereby earnestly and respectfully solicited at an early date. If the Examiner has any suggestions or comments or questions, calls are welcomed at the phone number below.

It is not anticipated that any fees are due or payable, since this response is being timely filed within 3 months of December 3, 2004 Office Action and no other fees are due or payable.

Respectfully submitted,

Charles W. Bethards
Reg. No. 36,453

Law Office of
Charles W. Bethards, LLP
PO Box 1622
Colleyville, Texas 76034
Phone (817) 581-7005
Fax (817) 281-7136
Customer No. 51874

Page 13 of 13